POLICY RESEARCH WORKING PAPER 2634

Chile's Regional Arrangements and the Free Trade Agreement of the Americas

The Importance of Market Access

Glenn W. Harrison
Thomas F. Rutherford
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Among Chile's bilateral regional agreements, only Chile's agreements with "Northern" partners provide enough market access to offset the costs to Chile of trade diversion. Because of preferential market access, however, "additive regionalism" is likely to provide Chile with far more gains than the static welfare gains from unilateral free trade. At least one partner country loses from each of the regional trade agreements considered in this study, and excluded countries always lose. The Free Trade Agreement of the Americas (FTAA) produces gains for almost all the member countries, but the European Union is a big loser. Countries of the Americas gain more in aggregate from global free trade than from the FTAA.

The World Bank
Development Research Group
Trade
July 2001

POLICY RESEARCH WORKING PAPER 2634

Summary findings

Using a multisector, multicountry, computable general equilibrium model, Harrison, Rutherford, and Tarr examine Chile's strategy of negotiating bilateral free trade agreements with all of its significant trading partners (referring to this policy as *additive regionalism*). They also evaluate the Free Trade Agreement of the Americas (FTAA) and global free trade.

Among Chile's bilateral regional agreements, only Chile's agreements with "Northern" partners provide enough market access to offset the costs to Chile of trade diversion. Because of preferential market access, however, additive regionalism is likely to provide Chile with many times as many gains as the static welfare gains from unilateral free trade.

Harrison, Rutherford, and Tarr find that at least one partner country loses from each of the regional trade agreements they consider, and excluded countries as a group always lose.

They estimate that the FTAA produces large welfare gains for the members, with the European Union being the big loser.

Gains to the world from global free trade are estimated to be at least 36 times greater than gains from the FTAA. Even countries of the Americas in aggregate gain more from global free trade than from the FTAA.

This paper—a product of Trade, Development Research Group—is part of a larger effort in the group to examine the impact of regional trade arrangements on development and poverty reduction. Copies of the paper are available free from the World Bank, 1818 H Street, NW, Washington, DC 20433. Please contact Lili Tabada, room MC3-333, telephone 202-473-6896, fax 202-522-1159, email address ltabada@worldbank.org. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. David Tarr may be contacted at dtarr@worldbank.org. July 2001. (39 pages)

Chile's Regional Arrangements and the Free Trade Agreement of the Americas: The Importance of Market Access

by

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JEL categories: F15; F17; F13; F14.

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Chile's Regional Arrangements and the Free Trade Agreement of the Americas: The Importance of Market Access

by Glenn W. Harrison, Thomas F. Rutherford and David G. Tarr*

1. Introduction

The analysis of regional trade arrangements is typically conducted in the framework of trade creation versus trade diversion, under which preferential tariff reduction is welfare inferior to non-preferential tariff reduction. Wonnacott and Wonnacott [1981] showed, however, that regional trade arrangements *could* produce more gains due to improved market access to trading partners. The logical extension of this argument is that if a country were to negotiate free trade agreements with all of its trade partners, it would end up with zero effective tariffs on all imports, or free trade, despite the legal existence of positive MFN tariffs. In the process it would achieve preferential access to its partners' markets. Hence, absent transition dynamics, this strategy may produce gains which are considerably larger than unilateral free trade.

We call the process of sequentially negotiating bilateral free trade agreements with all of your significant trading partners "additive regionalism." There is at least one country, Chile, that is pursuing a clearly articulated strategy of additive regionalism.[1] Does additive regionalism dominate free trade for Chile? If so, by how much? Since the answer is an empirical matter, and Chile is following such a strategy, we answer these questions for Chile.

The government of Chile has successfully concluded a free trade area with MERCOSUR and is seeking a free trade agreement with NAFTA.[2] Moreover, the government of Chile is attempting to add the

* We would like to acknowledge the helpful comments of anonymous referees of this journal; Jerry Haar of the North-South Center; Maurice Schiff, Alberto Valdes and L. Alan Winters of the World Bank; Dominique Hachette, Juan Coeymans and other seminar participants at Pontifica Universidad Catolica de Chile; Eugenia Muchnik and Hector Assael of the U.N. Economic Commission for Latin America in Santiago; Maria Wagner of the Chilean Ministry of Finance; M. Marcel of the Chilean Treasury; Andrea Butelmann, Klaus Schmidt-Hebbel, Ricardo Vicuña and seminar participants at the Central Bank of Chile; and Liselott Kana of the Chilean Ministry of Foreign Affairs. We thank Isidro Soloaga, Ulrich Reincke and Minerva Pateña for excellent research, translation and logistical support. We are grateful to the North-South Center for research support. The views expressed are *not* necessarily those of the World Bank or any of its Executive Directors, the North-South Center, any agency of the government of Chile, or those acknowledged.

[1] Mexico, Singapore and, to a lesser extent, MERCOSUR, may be following the same strategy.

[2] MERCOSUR is a customs union between Argentina, Brazil, Paraguay and Uruguay. Paraguay and Uruguay are too small to be included as separate countries in the our dataset we employ, so our MERCOSUR region excludes them. In a free trade area partner countries eliminate tariffs and export taxes or subsidies against each other, but retain separate tariffs against third countries. In a customs union partner regions adopt a common external tariff. Chile has rejected a customs union with MERCOSUR. Although negotiations for Chile's membership of NAFTA have stalled, many commentators believe that Chile

European Union (EU), the Rest of South America (RSA) and several other countries to its network of free trade arrangements.[3] More recently, momentum is building for a Free Trade Agreement of the Americas (FTAA), which will impact on the Chilean additive regionalism strategy.

It is well known that most results regarding the welfare effects of regional arrangements are typically ambiguous at the theoretical level, and that many questions are quantitative rather than qualitative. Thus, we employ an 11 region global computable general equilibrium (CGE) model to quantitatively examine the network of preferential arrangements that Chile is negotiating, as well as unilateral trade policy options in Chile. The FTAA is also relevant to Chile's regional strategy, as well as being important in its own right, so we also provide estimates of this agreement. Although the FTAA deserves a thorough treatment, these initial estimates should prove to be of some value in the debate over regionalism. Finally, we estimate the impact of Global Free Trade as a reference point. Our model includes the Chilean economy as well as the economies of Argentina, Brazil, Mexico, the United States, Canada, Central America, the Rest of South America, the EU, Japan and an aggregate Rest of the World. Consequently, we are able to estimate the impact on partner and excluded countries from each of the agreements we evaluate.

Critics of Chile's additive regionalism strategy, such as Donoso and Hachette [1996], argue that agreements with Southern countries are unlikely to be beneficial, and that it is not worth delaying the benefits of unilateral and multilateral tariff liberalization to pursue these agreements. They argue that only agreements with the EU, the US or Japan offer sufficient access to be worth pursuing. Advocates for the government's strategy, however, believe that there are gains to be achieved from the agreements with smaller Southern countries as well. They also argue, as in Butelmann and Meller [1995], that additive regionalism will progressively reduce trade diversion costs, lower the effective average tariff in Chile, and provide considerably improved market access. Furthermore, they note that Chile can unilaterally lower its external tariff while simultaneously pursuing additive regionalism to further reduce trade diversion costs.

We find that the results for NAFTA, MERCOSUR, and especially for additive regionalism, all point to the crucial importance of improved market access in preferential trading areas. Taken *bilaterally*, we find that trade diversion costs do indeed dominate the welfare effects of these agreements unless sufficient market access is obtained in partner countries (or third country tariffs are lowered).

The results provide support to the view that North-South agreements (e.g., Chile with the US or the EU) are likely to provide sufficient market access to be beneficial, while the results for our South-

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will eventually become the next member of NAFTA.

[3]As of early 2001, Chile had reached preferential trade agreements with at least 15 countries.

South agreement (Chile-MERCOSUR) suggest the opposite. The agreements which include a Northern partner increase the welfare of the members of the group in aggregate; only the Chile-MERCOSUR agreement results in net losses for the members as a group. We show, however, that Chile can unilaterally lower its external tariff (reducing trade diversion) so that even its agreement with MERCOSUR is beneficial.[4]

We find that Chile's additive regionalism strategy of combining free trade agreements with four regions, NAFTA, MERCOSUR, the EU and Rest of South America, produces welfare gains for Chile many multiples of the value of unilateral free trade if it attains tariff- free access to all these markets. This provides support for the theoretical insight of Wonnacott and Wonnacott [1981]. However, if the most highly protected sectors in the EU and Rest of South America are excluded from the agreements, the gains are dramatically reduced. [5]

Contrary to the Wonnacott and Wonnacott [1981] result, we estimate that at least one of Chile's potential partners in its additive regionalism strategy will lose in all of the options we evaluate. Adding the Rest of South America to its network of agreements would substantially improve Chile's preferential access and welfare, but would significantly reduce the real income of the Rest of South America, which would suffer large trade diversion losses with very little improved market access. Theory, intuition and experience indicate that preferential arrangements are unlikely to be implemented if the partner countries do not also expect to gain. Nonetheless, the gains for Chile remain substantial relative to unilateral free trade, if it could successfully negotiate these agreements with full market access.

We estimate that the FTAA will provide substantial benefits to the member countries, between $9.6 billion and 25.2 billion per year. With the exception of Mexico, which loses preferential access to the US market, all member countries gain. Central America reaps enormous gains by the standards of these models, due to a combination of preferential access and increased competition from a large region in its domestic markets. The estimated gains to the US are between $4.7 billion and $6.5 billion.

Excluded regions are always estimated to lose from any of the preferential arrangements we consider. The largest losses to excluded regions, among the preferential agreements we consider, derive from the FTAA. Estimated losses to excluded countries from the FTAA range range from -$9.1 billion to -$12.7 billion. The EU is the region that loses the most from the FTAA, and its losses of between -$4.8 billion and -$7.3 billion are about equal to the estimated gains of the US.

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[4]Chile has enacted legislation that will lower its external tariff from 11 to 6 percent in stages, as suggested by our paper. Thus, our estimates could be viewed as an ex post assessment of the policy of lowering the external tariff. In fact, the Vice-President of the Chilean Central Bank used estimates from an earlier version of our study in his testimony before the Chilean Parliament in favor of lowering the external tariff.

[5]In fact, the experience of some Mediterranean countries (Morocco, Tunisia, Turkey) in their preferential trade agreements with the EU suggests that the highly protected agricultural sectors are likely to be excluded from such an agreement.

The gains to the world from Global Free Trade are estimated to be between $199 billion and $456 billion per year. Depending on the elasticity assumption, the gains to the world are between 36 and 400 times greater than the gains to the world from the FTAA. Moreover, even the gains to the Americas (as an aggregate region) from Global Free Trade exceed the gains to the Americas from the FTAA, by about 33 to 40 percent. These results emphasize the continuing importance of multilateral liberalization.

Since Chile starts with a relatively efficient low uniform tariff of 11%, we estimate that it can obtain only small additional gains from improving the efficiency of its resource allocation by further *unilateral* reduction of its tariffs.[6] We show that a country like Chile that starts with a uniform tariff will typically have *the gains from joining a customs union reduced if it must adopt a non-uniform structure.* Conversely, if joining a customs union is a movement toward uniformity, the gains are likely to be augmented.[7] In general, this result indicates that the relative uniformity of the pre-existing tariff structure for a country, and the proposed common external tariff of any customs union, must be compared on a case-by-case basis to ascertain if welfare gains will actually be achieved.

We find that the *benefits of trade liberalization or regional trade arrangements are considerably reduced if tariff revenue must be replaced by distorting alternative taxes.* Similarly, in our optimal tariff calculations we find that unilateral trade liberalization can proceed to lower tariff levels if efficient replacement taxes are in place.[8]

Finally, we have produced an updated estimate of the collected VAT rates by sector in Chile[9], and show that Chile can reduce its legal VAT rates to about 50% of present levels and improve its welfare by 0.3% of GDP if it were able to eliminate evasion and collect the VAT uniformly.[10] These gains are significant when compared to unilateral trade liberalization options.

In Section 2 we describe the model and data. In Section 3 we present and explain the policy results for Chile. In Section 4 we examine the impact on partner and excluded countries of Chile's agreements. In Section 5 we examine the impact of the Free Trade Agreement of the Americas and Global Free Trade.

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[6] This conclusion ignores dynamic gains from trade liberalization, which could lead to much larger gains.

[7] Two other countries with uniform tariffs that may install a non-uniform tariff of a customs union are the Kyrgyz Republic and Estonia. The Kyrgyz Republic has a uniform tariff of 10% and has, in principle, agreed to join in a customs union with Russia, Belarus and Kazakstan. The Kyrgyz have not implemented the common external tariff, however, because of fears of the costs of the non-uniformity of the Russian tariff, which is the present common external tariff. See Michalopoulos and Tarr [1996] for details. Estonia also has a uniform tariff of zero and is one of the five transition economies the European Union has designated as candidate countries for accession. Estonian authorities have considerable concerns, however, about the costs of imposing the European Union's common external tariff, especially in the highly protected sectors.

[8] With low elasticities, however, there is an adverse terms-of-trade effect that mitigates the welfare gains from reduced costs of trade diversion.

[9] See Harrison, Rutherford and Tarr [1997b].

[10] In addition, we eliminate the output tax which applies primarily to energy and beverages and tobacco.

2. A Multi-Regional Trade Model

A. General Features

The quantitative model developed to evaluate the trade policy options facing Chile is multi-regional and multi-sectoral. Table 2 lists the 11 regions included explicitly in the model, as well as the 24 sectors included in each region. The general specification of this model follows our earlier multi-regional model of the effects of the Uruguay Round.[11] The most important differences are the inclusion of data for Chile, updated tariff rates for Argentina and Brazil, and more recent data for all other regions. We adopt a multi-region model, rather than a small open economy model, since we need to consider the possible effects on Chile of a reduction in Chile's import tariffs on other MERCOSUR members. Crucially, we also need to account for the "market access" effects on Chilean exports of a reduction of import tariffs by MERCOSUR, NAFTA or other regions with which Chile agrees to a free trade agreement, either separately or collectively.

Although the general theory of the welfare effects of preferential trading arrangements does allow for the impact of changes in partner country tariffs on the home country's terms-of-trade,[12] some empirical approaches to evaluating preferential trading arrangements ignore them.[13] Our framework allows us to explicitly evaluate the importance to Chile of improved market access to regions such as MERCOSUR and NAFTA, as well as losses Chile may suffer as partner countries raise export prices to Chile.

An important feature of the Chilean economy is that its tariff rate is a uniform 11% across all traded sectors.[14] Table 3 provides a summary of key data that are important in the analysis. The two columns labeled TAR_BRA% and TAR_USA% show the tariffs that Brazil and the United States apply on imports from third countries without tariff preferences. Argentinean tariffs are virtually identical to

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[11] Harrison, Rutherford and Tarr [1997c]. Web site HTTP://THEWEB.BADM.SC.EDU/GLENN/UR_PUB.HTM provides access to the model and related publications.

[12] See Wooton [1986] and Harrison, Rutherford and Wooton [1989] [1993].

[13] An example is the approach adopted by Bond [1996]. He develops a simple general equilibrium specification of the effects on Chile of these preferential trading arrangements with an impressive level of detail with respect to tariff data. His results for Chile joining NAFTA, however, differ significantly from ours since his CGE model does not incorporate the impact on Chile of access to NAFTA markets.

[14] Chile applies a variable levy system on imports of wheat and sugar and, less importantly, edible oils. Monthly prices over the previous two and one-half years for wheat and 50 months for sugar are examined and the distribution is truncated at the top and the bottom by an equal percentage (about 15%). The range of the resulting truncated distribution determines the upper and lower bounds. A tariff surcharge or reduction of the tariff below the 11% rate is applied if the price in the present month is below or above the bounds. Since the system is not based on a domestic support price, its impact varies enormously from year to year. Valdes [1996, p.55] estimates that, between 1985 and 1995, the nominal protection rate for sugar has ranged from 6 % to 98 %, and the nominal protection rate for wheat has ranged from 45 % to -10 % (see also Quiroz and Valdes [1993]). The price band system has increased protection for these products, but in our analysis we have ignored this impact, which biases downward our estimated gains from unilateral trade liberalization.

Brazilian.[15] In the case of the United States the tariff estimates include the tariff equivalents of the non-tariff barriers, which are quite important in the sectors with high tariffs. If Chile forms a free trade area with MERCOSUR or NAFTA, Chilean exporters will not face these tariffs, but outside exporters to these regions will. Thus, these data are crucial in assessing the value of increased access that Chile will obtain from MERCOSUR and NAFTA, respectively.

In Table 3, we also provide details on domestic distortions in Chile. The columns labeled VAT and TY represent estimates of the rates of collected value added tax in each industry and the tax on gross output, respectively. These rates were estimated using procedures explained in Harrison, Rutherford and Tarr [1997b; Appendix A]. The different rates of VAT across sectors arise mainly because of evasion of the VAT. One can see from Table 3 that the two largest sectors in Chile, trade and transport service sectors and other service sectors, have a combined 61% of value-added and are the sectors with the lowest rate of collected VAT.

B. Formal Specification

The Model. The general specification of the model follows our earlier work on the Uruguay Round. We concentrate here on what we have called our "base" model, which is static and assumes constant returns to scale (CRTS). Except for the fact that imports and exports are distinguished by many regions, the structure of the model within any country is very close to the basic model of de Melo and Tarr [1992]; the interested reader may consult their chapter 3 for a detailed explanation of the equations.

Briefly, production entails the use of intermediate inputs and primary factors (Labor, Capital and Land). Primary factors are mobile across sectors within a region, but are internationally immobile. We assume Constant Elasticity of Substitution (CES) production functions for value added, and Leontief production functions for intermediates and the value added composite. Output is differentiated between domestic output and exports, but exports are not differentiated by country of destination.

Each region has a single representative consumer who maximizes utility, as well as a single government agent. In Harrison, Rutherford and Tarr [1997b; Appendix C] we formally characterize the demand structure and elasticities which are critical to the results. Demand is characterized by nested CES utility functions for each agent, which allow multi-stage budgeting. Demand at the top level, for the composite "Armington" aggregate of each of the 24 goods in Table 2, is Cobb-Douglas. Consumers first choose how much of each Armington aggregate good to consume, like wheat, subject to aggregate incomes and composite prices of the aggregate goods. The Armington aggregate good is in turn a CES

[15] Estimates of the tariff rates for Brazil and Argentina are explained in detail in Harrison, Rutherford and Tarr [1997b; Appendix B].

composite of domestic production and aggregate imports. Consumers decide how much to spend on aggregate imports and the domestic good subject to the prior decision of how much income will be spent on this sector, and preferences for aggregate imports and domestic goods are represented by a CES utility function. Finally, consumers decide how to allocate expenditures across imports from the 10 other regions based on their CES utility function for imports from different regions and income allocated to consumption on imports from the previous higher level decision.

Data and Elasticities. Except for tariff data and the domestic tax data, the data employed to calibrate the model come primarily from the GTAP database documented in Gehlhar et al. [1996]. We use the preliminary release of version 3 of this database, current as of May 1996. The 11–region version of the model retains all the regions of the GTAP database that are directly relevant to our policy simulations. The full GTAP database contains 37 sectors.[16]

We generally assume that the lower-level elasticity of substitution between imports from different regions, σ_{MM}, is 30 and that the higher-level elasticity between aggregate imports and domestic production, σ_{DM}, is 15. We refer to these values as our central elasticities. There are econometric studies, such as those of Reinert and Roland-Holst [1992] and Shiells and Reinert [1993], that suggest values which are lower than these. However, the studies by Reidel [1988] and Athukorala and Reidel [1994] argue that when the model is properly specified the demand elasticities are not statistically different from infinity and their point estimates are close to the central elasticity values we have chosen. Moreover, elasticities would be expected to increase over time, and this model presumes an adjustment of about 10 years, a rather long period in the context of these econometric estimates.

To be clear, a value of $\sigma_{MM} = 30$ means that if Chile tried to raise its prices by 1% on world markets relative to an average of aggregate imports, Chilean imports would decline relative to aggregate imports by 30%. Given that there may be some economists who would prefer elasticities based on the econometric estimates yielding lower elasticity estimates, we also perform most of our important policy simulations with $\sigma_{MM} = 8$ and $\sigma_{DM} = 4$. We refer to these as our low elasticities. A high elasticity scenario for a small open economy such as Chile would be a specification with still less market power for exports, such as would occur with in the popular theoretical models of international trade where goods are homogeneous.

The elasticity of transformation between exports and domestic production is assumed to be about

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[16] Our sector aggregation to 24 sectors was undertaken in a manner that ensured that those sectors with significant rates of protection (in the principal trading partners of Chile) are retained as individual sectors. That is, we aggregated sectors which are not important in trade or which have low rates of protection. It is known that aggregation may significantly change the results in applied trade policy analysis, but that this type of aggregation results in quite small aggregation bias.

4 for each sector. Elasticities of substitution between primary factors of production are taken from Harrison, Jones, Kimball and Wigle [1993] and generally reflect econometric estimates for the United States. These estimates are relatively low for primary goods, around unity for manufacturing goods, and elastic for tertiary goods. We assume fixed coefficients between all intermediates and value added.

Distortions. All distortions are represented as *ad valorem* price-wedges. Border protection estimates combine tariff protection and the tariff equivalence of non-tariff barriers. For Brazil and Argentina, these data were estimated by Reincke in Harrison, Rutherford and Tarr [1997b; Appendix B]. Otherwise these data are taken from the GTAP database. The protection data are presented in Table 9. Other distortions include factor taxes in production, value-added taxes, export subsidies, voluntary export restraints (represented as *ad valorem* export tax equivalents). These are also taken from the GTAP database, except for domestic distortion data in Chile. The latter were estimated for this exercise by Soloaga in Harrison, Rutherford and Tarr [1997b; Appendix A]. Lump-sum replacement taxes or subsidies ensure that government revenue in each region stays constant at real benchmark levels. For Chile, however, we capture the marginal efficiency cost of the government having to raise extra revenues through a distortionary domestic tax system. For developing countries these costs could be quite significant, since the revenue losses from trade reform could be sizeable.

Solution Algorithm. The model is formulated using the GAMS-MPSGE software developed by Rutherford [1995] and solved using the PATH algorithm of Ferris and Munson [2000]. Although the model has 11 regions and 24 sectors, and is large by historical standards, it is smaller than our Uruguay Round model. Use of demand elasticities as high as those we employ could pose numerical problems in general, but this model solved without difficulty.

3. Policy Results for Chile

We first discuss how Chile will replace the revenue it will lose from lowering its tariffs and the welfare implications of these options. Next we discuss the results regarding the preferential trade area policy options. In section C we examine how Chile may use unilateral tariff reduction to optimize its trade policy. Finally, we examine the effects of Chile's strategy of "additive regionalism."

A. The Role of the Replacement Tax

Since Chile is reducing tariffs in most of our scenarios there is a revenue loss to the government. We impose an equi-revenue requirement in all simulations, and stipulate explicitly how the additional tax

revenue will be generated. We employ either the existing VAT, a uniform VAT, or a "Lump Sum" tax.

Welfare Effects of the Replacement Tax. Collection of the existing VAT is not uniform in Chile. According to our estimates in Table 3, it ranges from 0% up to 18% across sectors. Hence, raising revenue through the VAT generates distortions: when the VAT is increased, resources move into less highly taxed sectors. This reduces any possible gains from the trade policy change. Results for welfare using the existing VAT are presented in column 1 of Table 1.

In fact, we have estimated the "marginal cost of public funds" (MCF) of the existing VAT in Chile to be equal to 7.6%. This implies that consumers and producers will have to be taxed 1076 pesos for the government to receive 1000 pesos. The 76 pesos are a welfare loss to the Chilean economy.

We have also calculated the MCF of the Chilean tariff, and it equals 18.5%. Despite the fact that the tariff is uniform across sectors, and therefore imposes no intersectoral distortion costs, the Chilean tariff imposes a higher distortion cost than the VAT because the tariff favors domestic production over imports.

In column 5 of Table 1 we show the results of employing a "Lump Sum" tax as the replacement tax. This tax avoids the distortions of a non-uniform VAT since consumer income is taxed in a fixed amount independently of consumer choices. Hence there are no resource allocation effects from the revenue replacement tax instrument. The results show that there is an added welfare cost of using the VAT, as compared to the lump-sum alternative.

Finally, in column 3 of Table 1 we show the results of using a uniform VAT. In these scenarios we first counterfactually create an equilibrium in which all other domestic taxes and subsidies are zero and the VAT is uniform. The impact we evaluate is then solely due to the trade policy change alone. Since all sectors are taxed, and there is no labor-leisure choice, there is no way to take an action that will lower the tax. In other words, there are no resource allocation effects and the uniform VAT is essentially equivalent to a Lump Sum or distortionless tax in our model. In addition, any "second best" interaction effects of distortions between the tariff and the existing VAT will be removed if we start with a uniform VAT and no other distortions (for this reason the results for the Lump Sum tax and the uniform VAT may differ). In these scenarios we equalize the VAT across sectors and solve for the level of the VAT that is required to compensate for the lost revenues.

Revenue Effects. In column 2 of Table 1 we present the equiproportional increase in the VAT required to keep government revenue constant. For example, with central elasticities a free trade area with MERCOSUR will require a 45% increase in the VAT rate across sectors. That means if the collected

VAT rate is 10% in a sector (see Table 3), the collected VAT rate will have to increase to 14.5%. With central elasticities there is a strong substitution away from imports that pay tariffs in favor of imports from partner countries that are tariff free. Then the revenue requirements for the VAT are quite high in order to compensate for the lost tariff revenues. With low trade elasticities the revenue requirement for the VAT is much smaller, ranging from an increase between 17% and 26% in the three basic preferential trade arrangement scenarios presented in rows 1-3.

In columns 4 and 7 we show tariff revenues collected in the new equilibrium as a percentage of GDP. In our initial equilibrium tariff revenues are equal to about 3.6% of GDP, but in the preferential trade area scenarios (rows 1-3) they fall to between 0.9% and 2.7% of GDP. Thus, in the preferential trade area scenarios tariff revenues fall to between 25% and 75% of original tariff revenues. The loss of tariff revenue is higher with NAFTA (because NAFTA is a larger share of Chilean imports than MERCOSUR) and higher with central elasticities because of the greater trade diversion. The VAT revenues as a percentage of GDP constitute about 9% of GDP initially. Depending on the preferential trade area and elasticities, the tariff loss is between 0.9% and 2.7% of GDP. Hence, if the VAT is employed as the replacement tax it will be necessary for VAT revenues to increase by about 10% to 30%.

Some may question if the implied increase in the VAT is too high. To provide intuition for the model implications for the VAT, consider a particular scenario where the lost tariff revenue is about 2.5% of GDP, as in row 6 with central elasticities. It is estimated in Table 1 that the VAT rate will have to increase by 45% to a legal rate of about 26%. In 1994 the legal VAT rate of 18% generated VAT revenues of about 9% of GDP, so the legal rate was twice the collected rate. Assuming no change in the rate of VAT evasion, it will therefore be necessary to raise the VAT by 5% to generate 2.5% of GDP (i.e., from 18% to 23%).

Why does the model predict a required increase of the VAT rate to 26%, and not 23%? The reason the model predicts an extra 3% increase in the legal VAT rate is that an increase in the tax will induce a shift away from the highly taxed sectors and an erosion of the tax base. Given our model parameters, increases in the VAT continue to generate additions in revenue within the range under consideration, hence we remain on the revenue increasing side of the "Laffer curve". But it is possible that a more realistic representation of the VAT in Chile would incorporate an increase in evasion rates with increases in the VAT rate, or simply that the rate of VAT collection cannot be increased in some sectors. In this case, the required legal VAT rate increase and distortion costs of revenue replacement would be still higher than we have estimated, or possibly the VAT is not a feasible tax to generate

considerably more revenue without further reform in collection procedures.[17] Given the uncertainties of rates of evasion of VAT in Chile, these estimates should be taken as indicative of revenue requirements rather than as precise recommendations for the VAT rate. In fact, we emphasize below the importance of uniformity of collections.

B. Preferential Trade Area Options

Results in Table 1. The overall welfare results for the trade policy options are presented in Table 1. More detailed results on output, imports and exports for the main scenarios, with central elasticities, are displayed in Table 4 (see Harrison, Rutherford and Tarr [1997b] for detailed results with low elasticities). Welfare impacts are presented as a percent of GDP of Chile. They represent changes on a recurring, annual basis, so a 1% welfare gain should be interpreted as a 1% increase in real income *each year in the future*.

In the first row of Table 1 we present the results from the scenario where Chile forms a free trade area with MERCOSUR. We assume that each of the MERCOSUR countries represented in the model, Argentina and Brazil, reduce their tariffs, export subsidies or taxes on their trade with Chile to zero and that Chile does the same for its trade with MERCOSUR. Chile does *not* adopt the common external tariff of MERCOSUR in this scenario.

The second scenario, shown in row 2, represents Chile joining MERCOSUR as part of the customs union. In addition to the requirements of the scenario in row 1, in this case Chile adopts the common external tariff of MERCOSUR. Although Chile has not joined the MERCOSUR customs union, it is a potential policy option so we evaluate it in this scenario. For simplicity, we assume that the common external tariff that Chile adopts is the import tariff structure that Brazil currently has with the countries that are not in MERCOSUR.[18]

The third scenario, in row 3, is Chile forming a free trade area with NAFTA. In row 4, primarily

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[17] To quantify these ideas, we have simulated Chile's free trade area with MERCOSUR and NAFTA where we assume that the services and trade and transportation sectors cannot have their collected VAT rates increased due to evasion. (These are the sectors with low rates of VAT collection and where evasion of the VAT may prevent additional collections; together they produce about 65% of Chilean value-added.) With central elasticities, the welfare loss in this case from the free trade area with MERCOSUR is increased to -0.60% of GDP and the gains from the free trade area with NAFTA are reduced to 0.12% of GDP. As expected, the required rate of VAT increase jumps to about 75%.

[18] This tariff structure is slightly different than the tariff structure shown for Argentina. There are two reasons for this. First, there are exceptions to the common external tariff for Argentina and Brazil, as both countries continue to adapt their tariff schedules over time to the agreed common external tariff. In addition, Argentina and Brazil could well have adopted exactly the same common external tariff at a detailed tariff line level, but have different trade shares across these tariff lines. With the different trade weights, the rates that appear in the GTAP database at the 24 sector level reflect differences in these trade patterns, and need not reflect differences in the common external tariff at the detailed tariff line level. For ease of comparison we also assume in our "Chile customs union with MERCOSUR" scenario that Argentina adopts the tariff of Brazil as its common external tariff. This provides a clean representation of the MERCOSUR customs union for our purposes.

to help understand the results, we evaluate the consequences of a free trade agreement between Chile and NAFTA in which Chile does *not* obtain improved access to the NAFTA market. After discussion of these scenarios, we introduce further simulations to help explain the results and evaluate modified options.

The effects on welfare are dependent on both how Chile chooses to replace the lost tariff revenues and on assumed elasticities. Chile's preferential trade policy options with MERCOSUR lead to a loss of welfare with our preferred central trade elasticities and negligible gains or losses with low trade elasticities. With central trade elasticities, the trade diversion costs of an agreement with MERCOSUR typically dominate the trade creation effects. Moreover, based on the MERCOSUR external tariff, preferential access to the markets of MERCOSUR is insufficient to overcome this welfare loss in Chile's markets. Welfare losses are lower with lower assumed elasticities because there is less trade diversion when Chile's consumers are less willing to substitute MERCOSUR's products for those of the rest of the world.[19]

The results indicate that the customs union with MERCOSUR is an inferior outcome for Chile compared with a free trade agreement with MERCOSUR. Inspection of Table 3 reveals that MERCOSUR's tariff structure is diverse compared with Chile's tariff, which is uniform. Since the welfare costs of trade restrictions tend to increase disproportionately with the height of the tariff, Chile is better off with its own uniform tariff than with the common external tariff of the customs union.[20] That is, part of the costs to Chile of joining a customs union with MERCOSUR derive from the loss of tariff uniformity.

In comparing our results in rows 1-3 regarding Chile's preferential trade area options, the most important result is that the free trade area with NAFTA is beneficial to Chile while the other options are likely to present problems.[21] In order to ascertain the source of the gain to Chile from a free trade area with NAFTA, we performed the simulation in row 4 in which Chile lowers its tariffs against imports from NAFTA countries but does *not* obtain improved access in NAFTA markets. Although this is not a policy option that Chile would adopt, the results of row 4 show that *Chile loses from preferential reduction of its tariffs against NAFTA countries without reciprocal access to NAFTA markets*, since the trade diversion dominates the trade creation.

In order to identify even more precisely the source of the access gains from the FTA with

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[19] These results are consistent with those of Donoso and Hachette [1996] and Muchnik, Errazuriz and Dominguez [1996]. Based on the results of Muchnik et al., which focused on agriculture, Donoso and Hachette estimated that access to the MERCOSUR market would not offer significant gains to Chile.

[20] "Ramsey optimal" tariffs will vary inversely with the elasticity of demand. Typically, however, departures from uniformity do not conform with Ramsey optimal rules, but rather with political economy considerations (see Panagariya and Rodrik [1993]).

[21] Coeymans and Larrain [1994], Reinert and Roland-Holst [1996], and Hinojosa-Ojeda, Lewis and Robinson [1995] also found that Chile will gain from a free trade area with NAFTA.

NAFTA, we performed a simulation in which access to only one sector was not obtained: non-grain crops. Our estimates of the tariff distortions in Table 4 suggest that the United States tariff is likely to be central in this sector: there is a 20% tariff on non-grain crops.[22] In other words, Chile applies zero tariffs against NAFTA imports, and NAFTA applies zero tariffs against imports from Chile in all sectors except non-grain crops. Although not shown in Table 1, if Chile fails to obtain preferential access in non-grain crops, the welfare gains of 0.82% we obtained in the full access case now drop to a welfare loss of -0.58%. Thus access in non-grain crops is crucial to welfare gains from NAFTA.[23]

These results demonstrate the importance of improved access emphasized by Wonnacott and Wonnacott [1981]. Our results show that Chile can gain more from a FTA with NAFTA than it can from global free trade; but Chile can expect to lose from *any* of the preferential trade agreements we have considered if there is no improvement in access to partner country markets.

The Importance of Low Uniform Tariffs. These results differ from several earlier numerical evaluations of preferential trading areas (e.g., see Rutherford, Rutström and Tarr [1993] and Harrison, Rutherford and Tarr [1997a]). We speculate that part of the reason that trade diversion dominates trade creation in these estimates is that Chile has a low and uniform tariff. That is, although it is not true as a general proposition, the implementation of a preferential trade agreement in a country that starts with a dispersed tariff structure may result in a reduction in the dispersion of the tariff structure. Potential benefits from a reduction in the dispersion of the tariff, however, are ignored in more aggregated analyses of preferential trade arrangements.[24] To verify this intuition we have counterfactually created an initial

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[22] Although the GTAP database indicates that the U.S. tariff on non-grain crops is 47%, we have lowered this to 20% in our benchmark equilibrium for two reasons. First, we prefer updated estimates where possible. The most important non-grain crops products for Chile are fruits and vegetables, and post-Uruguay Round tariff rates for these products in the U.S. market are the relatively modest figures cited below in this footnote; the higher protection estimates for these products in the GTAP database (averaging 56%) were derived from an average of protection estimates in the 1989-1994 period. Second, the U.S. protection on these products varies with the season. We have assumed that given production in the opposite hemispheres, when Chilean fruits and vegetables are ready for harvest and export to the U.S., they would typically face U.S. tariffs that are in the low range of the seasonal tariffs applied by the United States. Products included in the non-grain crops category of the GTAP database (along with the estimated tariff and tariff equivalent of the non-tariff barrier in the U.S.) are: sugar, 67%; oilseeds, including peanuts, 25%; coffee, cocoa and tea, 0%; cotton, 31%; vegetables (fresh, 0-25%; frozen, 17.5-25%; dried, 25-35%, prepared and preserved, 13.6-14.7%); fruits (fresh, 0-20%, dehydrated, 0.6-2.2%; frozen, 0.7-14%; juices, 0-31.3%; jams and pastes, 7.0-35%; canned, 1.9-20%); and other non-food crops (tobacco, jute, etc), 19%. The reduced estimates are closer to the estimates of Butelmann and Meller [1995; p. 376]. They report that Chilean fresh, frozen and canned vegetables face MFN tariff rates in the United States ranging from 9.5% to 17.5% (with a few percentage reduction for the former two categories where GSP treatment applies), and that Chilean fruits face United States MFN tariffs from 1% to 10%.

[23] Since U.S. protection in milk products is also high, we examined the impact of denial of improved access in NAFTA markets for Chilean products on both non-grain crops and milk products. Chile exports very little milk products, however, so the welfare result was only slightly more adverse for Chile (-0.60% of GDP with central elasticities and existing VAT replacement) relative to denial of Chilean access in non-grain crops alone.

[24] There is value in further theoretical work into the generality of the impact of preferential arrangements on uniformity. Note also that in our model elasticities are equal across sectors, so the Ramsey optimal tariff is uniform. A useful exercise would be to evaluate the impact of a preferential trade arrangement where we start from randomly selected elasticities

equilibrium in which Chile applies a 22% tariff on one-half of its imports and a zero tariff on all others, and then implemented the policy scenarios in rows 1-4 of Table 1 (where we have employed existing VAT replacement and central elasticities). The sectors with the high tariffs were selected at random and the experiment was repeated 206 times. The means of the distributions for welfare as a percent of GDP are as follows: free trade area with MERCOSUR, -0.56%; customs union with MERCOSUR, -0.44%; free trade area with NAFTA, 1.47%; and free trade area with NAFTA but no improved access, -0.52%.

The gains the free trade area with NAFTA are significantly larger when based on the hypothetical non-uniform initial tariff structure. Similarly, the losses from the free trade area with MERCOSUR are slightly smaller, reflecting a movement toward uniformity. But losses from a preferential reduction of tariffs toward the NAFTA markets remain unless access to the NAFTA market is obtained.

In this hypothetical experiment, we find that the ranking of the customs union with MERCOSUR versus the free trade area with MERCOSUR is reversed compared with the actual situation represented by Table 1. Although Chile still loses from both preferential trade agreements with MERCOSUR, it is intuitive that the customs union produces less losses than the free trade area because the common external tariff of MERCOSUR is more uniform than the hypothetical Chilean tariff. In the actual situation of Table 1, the customs union with MERCOSUR represents *a movement away from uniformity.*

C. Optimizing Chile's Trade Policy Options

We know from theory that Chile can reduce the trade diversion costs of preferential trade areas if it lowers its external tariff. Thus a number of economists[25] have recommended a reduction in Chile's external tariff be combined with its free trade agreements. In rows 5 and 6 we evaluate the two free trade area options with a simultaneous reduction of the tariff to 6%. In rows 7 and 8 we evaluate the impact of lowering the external tariff to 8% and 6% on a multilateral basis. We evaluate going to global free trade in row 9.

We first explain why Chile may have a lowl optimal tariff despite being a small country. If Chilean exports are differentiated from the products of other countries so that Chile in aggregate faces a downward sloping demand curve for a product (even if individual Chilean producers do not perceive a downward sloping demand curve), then there will be an optimal export tax to maximize Chilean export profits. The height of the optimal export tax will be inversely related to the elasticity of demand faced by

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across sectors and see how often Chile gains from preferential trade agreements as we use a large number of distinct sets of elasticities.

[25] Such as Schiff [1996], Corbo [1966] and Leipziger and Winters [1996].

Chile in its export markets,[26] which is in turn determined by how substitutable Chile's products are with those of other countries. In the limit, when Chilean products are perfect substitutes in all its export markets for products from all other countries, Chile has no ability to obtain a higher price by restricting its exports. In this case the optimal export tax is zero.

Although Chile imposes virtually no export taxes, the Lerner symmetry theorem tells us that in general equilibrium import tariffs are equivalent to export taxes. The import tariff will tax all export sectors roughly uniformly. However, with product differentiation and many sectors, market power on exports differs across sectors and destination markets. Hence the import tariff is not as efficient an instrument as export taxes varying by sector and destination. Nonetheless, if export taxes are ruled out, there is a positive optimal import tariff. Given the existence of an 11 % uniform tariff, however, we investigate both theoretically and numerically whether the optimal tariff is above or below the existing 11 % tariff.

In our central elasticity scenarios we have assumed that all countries have an elasticity of substitution between imports from different countries (σ_{MM}) equal to 30. We show in Harrison, Rutherford and Tarr [1997b; Appendix C] that the optimal tariff t^* is bounded below by $t^* = \{[\sigma_{MM}/(\sigma_{MM}-1)] - 1\}$. Thus, even with $\sigma_{MM} = 30$ the optimal tariff is over 3%; but in our low elasticity scenarios, with $\sigma_{MM} = 8$, the optimal tariff is over 14%.

Considering the preferential trade options in rows 5 and 6, we see that there is the expected increase in the estimated welfare gains compared with rows 1 and 3, respectively. With central elasticities there is a significant improvement in welfare compared with an 11% external tariff. With low elasticities, the adverse terms-of-trade effect of reducing tariffs mitigates the welfare gain from reducing the trade diversion costs. These results show that as long as Chile limits itself to a free trade area it can profit from the increased access it obtains in its partner countries without excessive trade diversion costs, provided it lowers its external tariff sufficiently. In particular, the results in row 5 show that the free trade agreement with MERCOSUR can be expected to yield benefits when the external tariff is lowered to 6%. On the other hand, comparing rows 5 and 6, we observe that an agreement with NAFTA is worth a lot more than one with MERCOSUR, largely due to the superior market access of NAFTA.

In rows 7 and 8 we present the estimates of the welfare and replacement tax implications to Chile of unilaterally lowering its external tariff. With central elasticities and distortionless domestic taxes (Lump Sum or uniform VAT), unilateral reduction of the tariff to 6% increases welfare, and there are

[26] Individual competitive firms will price at their marginal costs, but since the country as a whole must accept a lower price to sell more, there is an optimal export tax that equates the marginal revenue received from exports equal to the marginal costs. The more elastic the demand, the lower the optimal export tax.

further gains from reducing tariffs from 8% to 6%. With the existing VAT as the replacement tax, reducing the tariff to 8% increases welfare. However, the distortion costs of the VAT are sufficiently close to the tariff, so that in combination with the small adverse terms-of-trade effects, there are no further gains from tariff reduction below 8%. With a distortionless replacement tax, reduction of the external tariff to zero produces positive welfare gains compared with the 11% tariff (row 9). However, since the gains are less than reduction to 6% (row 8) the optimal tariff is between 0% and 6%.[27]

With existing VAT replacement there is some limited scope for beneficial reduction of the tariff with central elasticities. Again, with higher elasticities the optimal tariff is lower and the gains from tariff reduction would increase.

D. Sectoral Impacts

In Table 4 we present the impacts under central elasticities on output, exports and imports at the 24–sector level from three of the principal trade policy options: the free trade area with MERCOSUR, the free trade area with NAFTA, and unilateral reduction of the tariff to 8%.[28] Focusing on the percentage change in output with central elasticities, the sectors that significantly expand with the free trade agreement with MERCOSUR are transportation equipment (dramatically),[29] machinery and equipment, iron and steel, and milk. With the free trade agreement with NAFTA the sectors that expand more than 10% are iron and steel, transportation equipment, milk, non-grain crops, and textiles. With unilateral tariff reduction the expanding sectors are transportation equipment, iron and steel, and to a lesser extent non-ferrous metals and mining.

Iron and steel and transportation equipment expand under all three trade policy options, but the other expanding sectors differ. Iron and steel and transportation equipment are both small sectors in Chile; in Table 3 we note that each sector produces less than 1% each of Chilean value-added. However, these are the two sectors that export the most intensively: both export over 90% of their output. Preferential or multilateral tariff reduction induces a depreciation of the real exchange rate, which makes exporting more profitable and gives a boost to the sectors which export intensively.

With unilateral tariff reduction the other sectors which expand (non-ferrous metals and mining) are also the ones that export a high percentage of their output. So the real exchange rate impact and

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[27] These were the results employed by the Vice-President of the Central Bank of Chile in his presentation before the lower house committee of the Chilean Parliament when he argued for a reduction of the tariff to 6%. In fact, we have separately calculated the optimum tariff with central elasticities at between 3% and 4%, and with the low elasticities about 14%, assuming Lump Sum replacement of tariff revenues in each case.

[28] See Harrison, Rutherford and Tarr [1997b] for the sectoral results with low elasticities.

[29] Although the expansion is dramatic in percentage terms, it is starting from a very small base. Thus the absolute increase is plausible.

export intensity explain well the pattern of expanding and contracting sectors with unilateral non-discriminatory tariff reduction.

With a free trade agreement with NAFTA, textiles, milk and non-grain crops expand, in addition to the two or three most export intensive sectors, because these three sectors obtain a substantial improvement in their terms-of-trade in the US market. We considered earlier how improved access to non-grain crops and milk is crucial to an improvement in Chilean welfare from NAFTA, and these sectoral results are consistent with those welfare results.

With the free trade agreement with MERCOSUR, machinery and equipment and milk expand in addition to transportation and iron and steel. Our data indicate that these two sectors are two of the most highly protected in MERCOSUR, so these sectors obtain relatively greater improvement in their terms-of-trade after implementation of a free trade agreement with MERCOSUR, which induces their expansion.

E. Additive Regionalism

Butelmann and Meller [1995] have articulated the strategy of the government of Chile: to negotiate bilateral free trade agreements with MERCOSUR, NAFTA and all of its significant and willing trading partners, including the EU and the Rest of South America (RSA).[30] They argue that this strategy will progressively lower the effective average tariff, successively reduce trade diversion costs and, crucially, help to assure stability of access to the markets of partner countries. The free trade agreement in late 1996 between Chile and Canada, in which both countries agreed to eschew antidumping actions against each other, is regarded as a notable example of the advantages that the bilateral approach offers. An opposing view within Chile is offered by Donoso and Hachette [1996], who argue that the limited market access of the bilateral agreements with the Southern countries (e.g., MERCOSUR) is not worth delaying the benefits of opening up unilaterally, although agreements with the large markets of the United States, the EU or Japan would be worthwhile. Moreover, they fear that the MERCOSUR arrangement may restrict broader liberalization.

In Table 5 we present estimates of the gains to Chile of progressively adding free trade agreements, where we use our central elasticities and a Lump Sum tax as the replacement tax. Columns 1 and 2 are reproduced from the estimates in Table 1. Column 3 shows that although MERCOSUR independently results in losses to Chile, when combined with an agreement with NAFTA, the impact of an agreement with MERCOSUR is positive rather than negative. The reason is that competition from

[30] The percentage share of Chile's aggregate exports (imports) for its most significant trading partners are: USA 14 (25); Brazil 5 (7); Argentina 5 (6); EU 32 (23); RSA 5 (5); and Japan 17 (10).

NAFTA producers greatly reduces the extent and impact of trade diversion.[31] Row 1, column 4 shows that combining agreements with NAFTA and MERCOSUR with an agreement with the EU results in a large increase in the gains to over 5% of GDP. Finally, adding a free trade agreement with the RSA results in gains of 8.4% of GDP. These are enormous estimated gains for a constant returns to scale model such as ours. In the last column of row 1 we exclude the US from the agreement, but this has only a small negative impact on Chile since it obtains such substantial preferential access in the other markets.

Critics of the government's strategy argue that it is unrealistic to assume that the EU would grant tariff free access in its highly protected agricultural products as part of a free trade agreement with Chile. The EU has steadfastly refused to do so in its Association Agreements with the Central and Eastern European countries and in its Free Trade and Customs Union Agreements with Mediterranean countries such as Morocco, Tunisia and Turkey. Hence it is unlikely to offer concessions to Chile that it has refused to offer to other countries for which it might be viewed as having more to gain geo-politically. Similarly, although more speculatively, it would be doubtful that tariff-free access in the most highly protected products (see Table 3) would be provided by the RSA, since (following Grossman and Helpman [1995]) the political economy interests that obtained such high protection would resist regional competition as well.

In row 2 of Table 5 we present results which more realistically reflect possible outcomes due to excluded products. We exclude agricultural products from the agreement with the EU, and we exclude products with tariffs above 25% in the RSA from that agreement. The results show, as expected, that without preferential access to these highly protected markets the gains would be dramatically reduced. The last column shows that the US is crucial to the whole story. If the US is not included in the additive agreements, the gains drop dramatically to 0.44% of GDP. The drop in welfare for Chile exceeds the gains from NAFTA alone, showing that competition from (and in) the US is important to Chile being able to avoid the trade diversion costs of these agreements. Conversely, if Chile can get a free trade agreement with the US as part of NAFTA, then free trade agreements with MERCOSUR, the EU and

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[31]NAFTA and MERCOSUR combined produce gains of 1.48% of GDP, whereas if the results of the NAFTA and MERCOSUR agreements were merely additive (columns 1 plus 2) the gains would be only 0.61 percent of GDP. That is, we find that reduced trade diversion from the combined agreements accounts for 0.87 percent of GDP. Since this may appear to be too large a saving due to reduced trade diversion, to verify our explanation we have three additional simulations: (1) Chile unilaterally eliminates tariffs on NAFTA imports without improved access to NAFTA; (2) Chile unilaterally eliminates tariffs on MERCOSUR imports without improved access to MERCOSUR; and (3) Chile unilaterally eliminates tariffs on NAFTA and MERCOSUR without improved access to NAFTA or MERCOSUR markets. If our explanation is correct, simulation 3 should result in reduced trade diversion costs of at least 0.87% of GDP, compared to additive losses of the first two simulations. In percent of GDP, the welfare impacts from these three simulations are: (1) -0.83; (2) -0.82; and (3) -0.77 (all as a percent of GDP). If the losses of the preferential tariff reduction were additive the total losses would be -1.65 (= -0.83 - 0.82). Since preferential tariff reduction against the two regions combined results in losses of only -0.77 percent of GDP, trade diversion costs are reduced by 0.88 percent of GDP by combining tariff reduction to the two regions.

RSA each add, impressively, about 0.5% to Chilean GDP. These gains accrue even when the EU and RSA exclude their most highly protected items from the agreements.

Proponents of the government's strategy maintain that the trade diversion costs of the free trade agreements will be diminished because Chile will adopt a 6% external tariff. Moreover, while they concede that access to the EU in agricultural products is unlikely, they maintain that it is possible that Chile will receive full access to the markets of RSA in view of the sustained trend toward open economies in Latin America. In row 3 of Table 5 we evaluate the impact of a 6% external tariff with the same products excluded from the agreements with the EU and RSA as in row 2. There are slightly larger gains to Chile from lowering the external tariff, but the US remains quite important for substantial gains. In rows 4 and 5 we evaluate additive regionalism where only EU agricultural products are excluded, so that full access to RSA is obtained. Columns 5 and 6 show that Chile obtains very substantial gains, with either a 6% or 11% external tariff, if it can obtain tariff-free access to the highly protected markets of RSA.

Thus, if Chile succeeds in including a wide net of countries in its additive regionalism strategy, the estimates of the welfare gains range from 0.44% to 8.4% of Chilean GDP. On the other hand, from Table 1 we see that the gains to Chile from unilateral trade liberalization are only about 0.11% of GDP. Hence, the estimated gains to Chile from additive regionalism are between 4 and 76 times the gains from unilateral trade liberalization. On balance, it appears that Chile has little to lose by pursuing additive regionalism, especially because additive regionalism is being combined with lowering the external tariff to about 6% to 8%.

4. The Impact on Partner and Excluded Countries of Additive Regionalism

Experience with regional trade arrangements has shown that if the agreement is not mutually beneficial to all parties, then it is unlikely to be effectively implemented or sustained (World Bank [2000]). Agreements may exist de facto, but are not implemented effectively. Thus, the impact on Chile's partner countries in the trade agreements is relevant to the likely success of the strategy in the long run. Moreover, even if the agreements are beneficial to Chile and its partners, if the benefits are derived from losses to countries that are excluded from the agreements, then clearly the agreements would be unattractive from the perspective of the multilateral trading system. Thus, it is important to estimate the impact on partner and excluded countries from the Chilean strategy of additive regionalism and assess the impact on the world in general.

Our estimates in Tables 6, 7 and 8 should help evaluate these issues. In Table 6 welfare gains are reported as a percent of own country GDP, both for our central and low elasticity cases. In order to be

able to compare gains and losses across countries, in Table 7 (central elasticity) and Table 8 (low elasticity) we present the estimated welfare gains in millions of 1995 US dollars. The first five columns of row 1 of Table 6 reproduce the results for Chile's additive regionalism strategy that we presented in the first five columns of table 5. Rows 2-11 present results for the other 10 countries or regions in our model. Columns 6 and 7 present results for new scenarios we discuss in section 5.

A. Impact on Individual Countries and Regions

First, from the first five columns of Table 6 we see that Chile is too small, or its trade pattern sufficiently different, for its regional agreements to have more than a trivial impact on about half of the countries and regions in the model (when we round welfare to the nearest one-hundredth of a percent of GDP the impact is either zero or one-hundredth of a percent). This group includes Japan and the Rest of the World (which are excluded from all the agreements evaluated in table 6) and the United States and the European Union (which are excluded in some of the arrangements in table 6 and included in others). Canada is also essentially unaffected by the trade policy options of Chile.

The Rest of South America and Central America, on the other hand, lose from all the agreements from which they are excluded, although the welfare loss is only about 5 hundredths of a percent of their GDP. These regions compete with Chile for the markets in MERCOSUR and NAFTA and compete with producers from MERCOSUR and NAFTA for the Chilean market. In both cases they lose access to markets since there is a decline in the demand for their exports due to preferential access arrangements between Chile and its partners which adversely affects their terms of trade and welfare.[32]

Perhaps most interesting is that while the Rest of South America loses from being excluded by Chile, the biggest loss for this region by far is when Rest of South America *is included* with Chile in a free trade agreement (column 5). The Rest of South America has high protection on the products mentioned in footnote b to table 5. To the extent that Chilean imports displace imports from other countries in the Rest of South America, the Rest of South America loses the tariff revenue on imports. Although there is some trade creation from tariff free access to Chilean imports in the Rest of South America, the tariff loss dominates the trade creation due to the high level of the tariffs.[33]

For Mexico, competition from Chile for preferred access in the US market results in a very small negative impact of including Chile in NAFTA. When Chile combines an agreement with NAFTA with an agreement with MERCOSUR, the diversification of Chilean exports results in less displacement of

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[32]This is consistent with the evidence of Winters and Wang [2001]. They found that the price of imports from the United States and Korea in Brazil fell after the formation of MERCOSUR.

[33]If the high tariff products mentioned above are excluded from the free trade agreement with Chile, the losses are reduced to about one-third of their level (to -0.36%).

Mexican exports in the US, so the negative impact on Mexico of Chile in NAFTA is reduced. When Chile adds the EU to its group of free trade agreements, the diversification of Chilean exports reduces the small negative impact on Mexico of Chile's preferential access to the US to virtually zero.

Brazil and Argentina both gain small amounts from a MERCOSUR free trade agreement with Chile. This is partly explained by improved access to the Chilean market for MERCOSUR producers. It is also likely that part of the explanation for this result is that Brazil and Argentina reduce trade diversion costs of MERCOSUR when they add new partners. That is, Chile will compete with Brazilian producers in Argentinian markets. This will reduce the trade diversion costs of Argentina from importing *Brazilian* products under the MERCOSUR agreement. Of course, Chile could will displace imports from the Rest of the World in Argentinian markets, which could increase Argentinian trade diversion costs. But as more countries are added to a network of preferential trading arrangements the trade diversion costs associated with earlier partners is reduced, especially if these are large countries that interject significant competition.[34] Comparing columns 4 and 5, we see that Brazil and Argentina both lose from Chile negotiating a free trade agreement with the Rest of South America. This is likely due to a terms of trade loss in the markets of the Rest of South America.

B. Aggregate Impact of Chile's Additive Regionalism Strategy

Even if Chile gains from an agreement or set of agreements, there is the question of whether Chile gains only because other countries lose. In Tables 7 and 8 we convert the percentage gains and losses of Table 6 into gains and losses in millions of 1995 US dollars. This allows us to compare gains and losses across countries and arrive at a total for the world. In row 12 we sum the welfare effects for countries that are included in the agreement. For example, Chile-MERCOSUR (column 1) includes Chile, Argentina and Brazil in our model. Row 13 is sum of the welfare effect for all countries that are not part of the agreement (e.g.g all countries other than Chile, Argentina and Brazil in the case of Chile-MERCOSUR). Row 14 is the sum over all countries.

From row 12, we see that Chile-MERCOSUR is an agreement that is dominated by trade diversion, to the extent that even the members of the agreement lose in aggregate. But this agreement is the only one we consider that results in losses for the *member* countries. Other agreements that we consider in Tables 7 and 8 are "North-South" agreements (in particular, all include the United States), and we estimate that all of these result in aggregate net benefits for the member countries, even though at least one member loses in all of them. The inclusion of the United States means that significant competition is

[34]It is possible, however, that a new partner could divert imports from an excluded country and add to the trade diversion costs on balance.

injected into the markets of participating members and this reduces the likelihood of trade diversion dominating.

From row 13 we see that all of the preferential arrangements we consider result in losses for the excluded countries or regions. The largest losses for the excluded countries arises from the Free Trade Agreement of the Americas, where the EU loses due to a loss of terms of trade throughout the Americas. These results are consistent with the results of Chang and Winters [1998]. Employing ex post data, they have shown that there can be a very significant negative welfare effect (through negative terms of trade effects) on countries excluded from regional arrangements. In particular, they estimate that MERCOSUR induced losses for the United States, Germany, Japan, Korea and Chile of about $800 million per year, which was about nine percent of the value of their exports to MERCOSUR.[35]

For the world as a whole, with central elasticities (Table 7) the agreement with MERCOSUR results in losses for the world of $183 million, primarily due to the trade diversion costs for Chile and the terms of trade loss for the EU. Independent of elasticities, the agreements in the first three columns result in essentially a zero impact for the world or for the three excluded regions outside of the Western Hemisphere (rounded to the nearest hundredth of a percent of their own GDP). With NAFTA involved, Chile has significant gains, but the terms of trade loss for the excluded countries is almost as much as the gains to Chile, so the impact on the world in small.

In columns 4 and 5 we see that the gains for the world become significant when the EU is added or when the EU and the Rest of South America are added to Chile's network of agreements. The main reason there are much larger gains to the world is that the gains to Chile become very large when it obtains preferential access to the markets of the EU and the Rest of South America. As explained, given the high protection on selected products in the Rest of South America, the trade diversion costs in this region significantly reduce the gains to the world from including this region in Chile's network of free trade agreements.

5. The Impact of the Free Trade Agreement of the Americas and Comparison to Global Free Trade

The Free Trade Agreement of the Americas (FTAA) is clearly worthy of an extensive treatment. The estimates we provide in this section provide an initial assessment of likely impacts across the countries and regions of our model. The FTAA also impacts Chile's additive regionalism strategy, so is

[35]We estimate a very small negative effect for Central America as a result of Chile forming a free trade area with NAFTA.

relevant in the context on our principal focus. As a point of comparison, we also estimate the impact of global free trade on the countries and regions of our model. These results are presented in columns 6 and 7 of Tables 6, 7 and 8. The average external protection rates of all the countries and regions in our model are presented in Table 9, where the protection rates include the estimated tariff equivalent of the non-tariff barriers.

A. Impact of the Free Trade Agreement of the Americas

From row 12 of Tables 7 and 8, we see that the FTAA generates substantial welfare gains for the countries of the Americas in aggregate: $25.2 billion per year, or $9.6 billion per year depending on elasticities. This indicates that the FTAA is "trade creating" for the member countries in aggregate. The excluded countries, on the other hand, lose between $12.7 billion and $9.1 billion per year. In the central elasticity case, the world as a whole gains $12.4 billion from the FTAA, but only very little in the low elasticity case. With central elasticities, there is so much competition within the Americas that the gains to the members countries of additional trade creation vastly exceed the costs to the excluded countries. Reduced competition in the low elasticity case greatly reduces the estimated gains within the Americas so that the net impact on the world is reduced to $0.5 billion.

Almost all of the individual countries and regions in the Americas are estimated to gain. Central America is notable by the standards of these types of models, for the enormous estimated gains, equal to 16% or 7% of its GDP, depending on elasticities. The gains are roughly equally attributable to preferential access to markets in the Americas and to increased competition in its own markets. That is, similar to other countries in the Hemisphere, Central America obtains an improvement of its terms of trade throughout the Americas relative to countries outside the Americas. In addition, in the cases of NAFTA and MERCOSUR it obtains improved access relative to countries within these agreements. Moreover, given the size of the aggregate economy of the Americas, competition from this large region in the markets of Central America results in gains from trade creation in its own markets which were protected at levels that were quite costly to itself in products like grains, textiles, meat and beverages and tobacco (see Table 9). Through comparison with the results of Global Free Trade for Central America, we see that both preferential access and increased competition in its own markets are important parts of the explanation of the results for Central America. The region gains about twice as much from the FTAA as it does from Global Free Trade, so preferential access is important. But Global Free Trade is also quite valuable to Central America, where the gains come primarily from improved resource allocation in its own market due to increased competition from global competitors.

The only exception to this pattern of gains within the Americas from the FTAA is Mexico (and

Canada in the low elasticity case). Mexico sees an erosion of its preferential access to the US market and thus loses $1.4 billion in the central elasticity case.

All excluded regions in the model lose from the FTAA due to terms of trade losses. The big loser from the FTAA in dollar terms is the EU, which loses $7.3 billion or $4.8 billion depending on elasticities. The estimated losses of the EU from the FTAA are almost exactly offset by the estimated gains to the United States. The European Union, however, has negotiated free trade arrangements with several countries or regions in the Americas, which would likely reduce these losses.

B. Impact of Global Free Trade

The results for global free trade are presented in the column 7 of Tables 6, 7 and 8. As expected the gains to the world vastly exceed the gains from any regional arrangement. In the central elasticity case, multilateral global free trade results in estimated gains to the world that are 36 times greater than the value of the gains from the FTAA, and in the low elasticity case the ratio is over 400 to 1. Even the Americas gain more from multilateral global free trade than from the FTAA. The aggregate gain to the Americas from global free trade is $35.6 billion with central elasticities, or $12.8 billion with low elasticities, so the Americas in aggregate gain 33% to 41% more from Global Free Trade. These results emphasize the importance of moving toward lower trade barriers in the multilateral context.

Mexico (and Canada in the low elasticity case), however, is an exception. Mexico sees losses from global free trade due to the erosion of favored access to the US market.

6. Conclusions

Our results for Chile point to some more general themes regarding regional trading arrangements. One clear theme is that improved market access in preferential trading areas is important. In the case of Chile, trade diversion costs dominate the welfare effects of bilateral agreements unless sufficient market access is obtained in partner countries (or third country tariffs are lowered). The North-South agreements generally provide sufficient access to make them beneficial, but the South-South agreement we examined did not (although Chile could lower its external tariff to make the South-South arrangement beneficial). We show that efficient replacement taxes are important with either regional or unilateral trade policy changes, and provide greater scope for trade policy action. Finally, our range of estimates for the gains from additive regionalism indicate that Chile has little to lose by pursuing this strategy, and may potentially gain many multiples of the gains from unilateral trade liberalization.

We find that the excluded countries lose from all of the regional arrangements that we examine and that the biggest losses for the excluded countries arise from the Free Trade Agreement of the

Americas. The EU is estimated to be the big loser from the FTAA in an amount roughly equal to the gains to the US. On the other hand, the FTAA generates some substantial gains to the members of the Hemisphere, with the exception of Mexico and Canada.

Chile's additive regional arrangements have an almost imperceptible impact on world welfare, while the FTAA is quite positive with our central elasticities. Nonetheless, we estimate that Global Free Trade generates gains to the world that are between 30 and 400 times greater than the gains from the FTAA. Even the Americas as a whole gain more from Global Free Trade than from the FTAA, emphasizing the importance of moving toward lower trade barriers in the multilateral context.

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Table 1: Welfare and Government Revenue Results for Chile's Trade Policy Options

Policy Simulation	With Replacement Taxes As:					Combined Effect of Uniform VAT and Trade Policy a/	
	Existing VAT		Uniform VAT a/		Lump Sum		
	% change in welfare c/	% change in VAT d/	% change in welfare c/	tariff revenue % of GDP	% change in welfare c/	% change in welfare c/	tariff revenue % of GDP
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. FTA with Mercosur (central elasticities)	-0.62	45	-0.40	1.7	-0.43	-0.19	1.8
(low elasticities)	0.04	17	0.07	2.7	0.08	0.19	2.7
2. Customs Union with Mercosur (central elasticities)	-0.95	52	-0.74	1.3	-0.73	-0.62	1.2
(low elasticities)	-0.20	21	-0.22	2.5	-0.17	-0.14	2.5
3. FTA with NAFTA (central elasticities)	0.82	48	1.03	0.9	1.04	1.23	0.9
(low elasticities)	0.30	26	0.31	2.1	0.38	0.43	2.1
4. Zero tariffs on NAFTA imports, no improved access (central elasticities)	-1.11	62	-0.92	0.7	-0.83	-0.64	0.7
(low elasticities)	-0.47	30	-0.45	2.0	-0.41	-0.33	2.0
5. FTA with Mercosur and 6% external tariff (central elasticities)	0.12	49	0.44	1.7	0.35	0.61	1.7
(low elasticities)	0.06	38	0.11	1.7	0.13	0.21	1.7
6. FTA with NAFTA and 6% external tariff (central elasticities)	1.46	45	1.72	1.1	1.70	1.89	1.1
(low elasticities)	0.41	41	0.45	1.4	0.49	0.55	1.4
7. Reduce external tariff to 8% (central elasticities)	0.02	16	0.12	2.9	0.10	0.41	2.9
(low elasticities)	-0.11	17	-0.08	2.7	-0.06	0.03	2.7
8. Reduce external tariff to 6% (central elasticities)	0.01	28	0.16	2.3	0.11	0.43	2.3
(low elasticities)	-0.18	30	-0.14	2.1	-0.14	-0.04	2.1
9. Reduce external tariff to zero (central elasticities)	-0.26	76	0.02	0	0.09	0.21	0
(low elasticities)	-0.54	72	-0.45	0	-0.42	-0.37	0

a/ In these scenarios we first create an equilibrium with a uniform VAT, no other domestic taxes, then evaluate the "pure" effects of the trade policy.
b/ These scenarios combine the impacts of the trade policy simulation with going to a uniform VAT and elimination of the domestic output tax, government revenues held constant.
c/ Percentage change in Hicksian equivalent variation as a percentage of GDP.
d/ Required equiproportional increase in the VAT rate across all sectors to keep government revenues unchanged.

Table 2: Commodities, Regions & Factors of Production in the Chile Model

Commodities

WHT	Wheat
GRO	Other Grains
NGC	Non-grain crops
WOL	Wool and Other livestock
FRS	Forestry
FSH	Fishing
ENR	Energy products
MIN	Mineral products
MEA	Meat products
MIL	Milk products
FOO	Other food products
B_T	Beverages and tobacco
TEX	Textiles and apparel and leather products
LUM	Lumber and wood
PPP	Pulp and paper
CRP	Chemicals rubber and plastics
I_S	Primary ferrous metals
NFM	Non-ferrous metals
FMP	Fabricated metal products
TRN	Transport industries
MAC	Machinery and equipment
T_T	Trade and transport
SER	Services
CGD	Savings good

Regions

CHL	Chile
ARG	Argentina
BRA	Brazil
RSA	Rest of South America
USA	United States of America
CAN	Canada
MEX	Mexico
CAM	Central America and Caribbean
E_U	European Union 15
JPN	Japan
ROW	Rest of World

Factors

LND	Land
LAB	Labor
CAP	Capital

Table 3: Value Added Shares, Trade Structure, Tariffs [a/] and Indirect Taxes in Chile

VA%	Sectoral value added as a percent of aggregate value added
EXPORT%	Sector exports as a percent of aggregate exports
IMPORT%	Sector imports as a percent of aggregate imports
EXPORT INTENSITY	Sector exports as a percentage of domestic output
IMPORT INTENSITY	Sector imports as a percentage of domestic demand
VAT	Estimated collected value added tax rate in Chile
TY	Estimated output tax by sector in Chile

Sector	VA%	EXPORT%	IMPORT%	EXPORT INTENSITY	IMPORT INTENSITY	VAT	TY
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
WHT	1		1		17	17.2	2.7
GRO			1	16	30	17.2	2.7
NGC	6	11	1	44	9	16.8	2.8
WOL	2			2	2	3.8	0.6
FRS	1	1		32		1.8	1.3
FSH	2	4		43	1	6.9	0.8
ENR	2		10	1	29	14.2	12.1
MIN	5	12	2	41	9		0.3
MEA			1	2	7	18	-0.1
MIL			1	1	12	18	0.3
FOO	2	9	2	24	8	18	0.1
B_T	1	1	1	16	9	18	27.6
TEX	1	2	7	9	33	18	0.5
LUM	2	4		40	7	18	0.9
PPP	2	6	2	42	21	18	0.7
CRP	2	3	11	14	39	14.2	0.5
I_S		1	3	91	98	6.1	0.8
NFM	4	25	1	74	7	17.6	0.9
FMP	1		2	5	20	11.5	0.2
TRN		1	16	99	100	9.8	-1.3
MAC		2	27	39	91	10.3	0.7
T_T	21	10	6	9	7	2.8	2.2
SER	44	7	8	4	5	3	2.2

Source: GTAP Database, version 3 (preliminary), authors' calculations, and Harrison, Rutherford and Tarr [1997b, appendix A] for VAT and TY rates.

Table 4: Effects of Policies on Chilean Production and Trade (Central Elasticities & Existing VAT Replacement)

OUTPUT: Percent change in domestically produced output in Chile
EXPORT: Percent change in Chilean exports
IMPORT: Percent change in Chilean imports
IMP_ARG: Percent change in Argentinian imports
IMP_BRA: Percent change in Brazilian imports
IMP_USA: Percent change in US imports

Free Trade Area with Mercosur--central elasticities and existing VAT replacement

	OUTPUT	EXPORT	IMPORT	IMP_ARG	IMP_BRA	IMP_USA
WHT	-5	-1	-14	10		
GRO	-27	-18	36	6	-3	-2
NGC	-4	2	46	10	4	
WOL	-6	14	92	-6	3	
FRS	-5	1	24	8	4	
FSH	-6	-1	36	4		
ENR	-7	2	7	-20	1	
MIN	3	13	59	1	32	
MEA	-6	12	58	4	-6	
MIL	50		-3	2	-1	
FOO	-11	-1	88	17	3	-1
B_T	1	18	13	9	10	
TEX	-11	20	17	-2	-2	
LUM	-7	-6	53	15	-3	
PPP	-15	-6	37	8	7	
CRP	-22	-9	23	-15	-1	
I_S	101	60	18	3	-6	
NFM	1	3	182	22	50	-1
FMP	-1	24	60	-7	3	
TRN	2523	2525	38	11	3	
MAC	105	164	-3	-4	-1	
T_T	-1	4	23	3	1	
SER	-1	10	45	13	9	

Free Trade Area with NAFTA--central elasticities and existing VAT replacement

	OUTPUT	EXPORT	IMPORT	IMP_ARG	IMP_BRA	IMP_USA
WHT	-59	-71	124	5		-1
GRO	-78	-75	137	-6	1	-9
NGC	46	98	73	-1	-1	2
WOL	-17	-28	349		-1	-1
FRS	-8		18	-1	-1	
FSH	1	8	-13			
ENR	-4	3	9	-1		
MIN	5	11	75		1	
MEA	-10	-23	61	-1	-2	-1
MIL	81	2	-1			
FOO	-11	-5	72			1
B_T	-1	27	55			1
TEX	15	155	13			
LUM	-9	-6	96			
PPP	-29	-26	53		-1	
CRP	-25	-8	32			
I_S	771	458	5			1
NFM	9	13	26	-1	-4	4
FMP	-11	-5	82			
TRN	123	123	3			
MAC	-13	4	3			
T_T	-2	4	103	-1		
SER	-1	16	111	-1	-1	

Reduce External Tariffs to 8 Percent--Central elasticities and Existing VAT replacement

	OUTPUT	EXPORT	IMPORT	IMP_ARG	IMP_BRA
WHT	-9	-4	19	-1	
GRO	-8	-3	15		
NGC	1	5	20		
WOL	-2	4	13		
FRS	1	7	8		
FSH	2	4	15		
ENR	-3	5	5		
MIN	4	7	22		1
MEA	-2	3	14		
MIL			1		
FOO	-1	3	16		
B_T		6	10		
TEX	-8	-3	10		
LUM	-1	2	22		
PPP	-3	1	9		
CRP	-8	-2	7		
I_S	54	32	1		
NFM	8	11	5	1	2
FMP	-1	5	17		
TRN	60	59	1		
MAC		5	1		
T_T		6	16		
SER		5	18		

Source: Model estimates.

Table 5. Welfare Results of Additive Free Trade Agreements by Chile (Chilean gains as a percent of Chilean GDP with central elasticities & Lump Sum tax replacement)

	AGREEMENTS WITH:					
	MERCOSUR	*NAFTA*	*NAFTA & MERCOSUR*	*NAFTA & MERCOSUR& EU*	*NAFTA & MERCOSUR & EU & Rest of SA*[a]	*CANADA & MEXICO MERCOSUR & EU & Rest of SA*[a]
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Product Coverage						
1. All products included	-0.43	1.04	1.48	5.24	8.4	8.16
2. Excluded products:[b]	-0.43	1.04	1.48	2.02	2.48	0.44
3. Excluded products[b] and 6% external tariff	0.35	1.70	2.01	2.29	2.66	0.87
4. Only EU AG. products excluded	-0.43	1.04	1.48	2.02	5.48	3.90
5. Only EU AG. products excluded and 6% tariff	0.35	1.70	2.01	2.29	5.71	4.44

[a] Rest of SA is South America except for Chile and the MERCOSUR countries.

[b] Excluded products in the agreement with the EU and their tariffs plus non-tariff equivalents in the EU are: wheat (57%), grains (74%), non-grain crops (51%), fishing (14%), meat (63%), and milk (129%). Excluded products in the agreement with the Rest of South America (and their tariffs) are: non-grain crops (29%), meat (51%), milk (27%), food (34%), beverages and tobacco (55%), textiles and apparel (46%), chemicals, rubber and plastics (31%), fabricated metal products (43%), and machinery (52%).

[c] Only the agricultural products from the EU listed in footnote b are excluded from any of the FTAs.

Source: Model estimates by authors.

Table 6. The Welfare Impact of Chile's Additive Free Trade Agreements, the Free Trade Agreement of the Americas and Global Free Trade [a]
(Welfare gains as a percent of each country's GDP)

		AGREEMENTS WITH:						
		MERCOSUR	*NAFTA*	*NAFTA & MERCOSUR*	*NAFTA & MERCOSUR& EU*	*NAFTA & MERCOSUR & EU & Rest of SA [b]*	*FREE TRADE AGREEMENT OF THE AMERICAS*	*GLOBAL FREE TRADE*
		(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Country	**Elasticity**							
1. Chile	(central)	-0.40	1.04	1.48	5.24	8.40	1.25	1.26
	(low)	0.00	0.37	0.60	2.55	3.31	0.53	0.68
2. United States	(central)	0.00	0.00	0.00	0.00	0.00	0.11	0.34
	(low)	0.00	0.01	0.00	0.00	0.00	0.08	0.18
3. Canada	(central)	0.00	0.00	0.00	0.00	0.01	0.08	0.42
	(low)	0.00	0.00	0.00	0.00	0.00	-0.05	-0.36
4. Mexico	(central)	0.00	-0.02	-0.01	0.00	0.00	-0.43	-1.38
	(low)	0.00	-0.01	-0.01	0.00	0.00	-0.21	-1.02
5. Argentina	(central)	0.06	0.00	0.10	0.12	0.07	0.31	0.82
	(low)	0.00	-0.01	0.02	0.02	0.01	0.09	0.60
6. Brazil	(central)	0.02	-0.01	-0.04	-0.04	-0.02	0.57	0.94
	(low)	0.00	-0.01	0.00	0.00	-0.01	0.16	0.24
7. Central America	(central)	0.00	-0.06	-0.05	-0.04	-0.06	16.16	9.70
	(low)	0.00	-0.03	-0.03	-0.05	-0.06	6.68	4.42
8. Rest of So. America	(central)	0.00	-0.03	-0.06	-0.04	-1.19	3.48	4.40
	(low)	0.00	-0.02	-0.04	-0.05	-0.22	0.47	1.25
9. European Union	(central)	0.00	0.00	0.00	0.00	0.00	-0.10	2.74
	(low)	0.00	0.00	0.00	0.00	0.00	-0.06	1.17
10. Japan	(central)	0.00	0.00	0.00	0.00	0.00	-0.01	3.43
	(low)	0.00	0.00	0.00	0.00	0.00	-0.02	1.98
11. Rest of the World	(central)	0.00	0.00	0.00	0.00	0.00	-0.11	1.97
	(low)	0.00	0.00	0.00	0.01	0.01	-0.08	0.54

[a] All products included in agreements and lumpsum tax replacement.
[b] Rest of SA is South America except for Chile, Argentina and Brazil.

Source: Model estimates by authors.

Table 7. The Welfare Impact of Chile's Additive Free Trade Agreements, the Free Trade Agreement of the Americas and Global Free Trade [a]
(Welfare gains in millions of 1995 US dollars, central elasticity case)

	AGREEMENTS WITH:						
	MERCOSUR	*NAFTA*	*NAFTA & MERCOSUR*	*NAFTA & MERCOSUR& EU*	*NAFTA & MERCOSUR & EU & Rest of SA [b]*	*FREE TRADE AGREEMENT OF THE AMERICAS*	*GLOBAL FREE TRADE*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Country							
1. Chile	-291	414	590	2090	3350	499	504
2. United States	-7	51	-29	138	60	6506	19972
3. Canada	5	-20	-22	23	49	456	243
4. Mexico	13	-58	-44	-11	15	-1428	-4539
5. Argentina	63	-1	222	264	147	687	1832
6. Brazil	214	-42	-171	-161	-70	2381	3912
7. Central America	4	-37	-32	-23	-38	10179	6112
8. Rest of So. America	-34	-56	-95	-73	-2024	5888	7456
9. European Union	-184	-156	-336	-88	-200	-7316	207413
10. Japan	-58	-19	-30	81	-2	-536	127664
11. Rest of the World	92	-73	-50	-115	6	-4867	85111
12. Sum for Included Countries [c]	-14	387	546	2255	1327	25168	
13. Sum for Excluded Countries [d]	-169	-384	-543	-130	-34	-12719	
14. Sum over all counttries	-183	3	3	2125	1293	12449	455680

[a] All products included in agreements and lumpsum tax replacement.
[b] Rest of SA is South America except for Chile, Argentina and Brazil.
[c] Sum of the welfare impact for countries included in the agreement.
[d] Sum of the welfare impact for countries excluded from the agreement.
Source: Model estimates by authors.

Table 8. The Welfare Impact of Chile's Additive Free Trade Agreements, the Free Trade Agreement of the Americas and Global Free Trade [a]
(Welfare gains in millions of 1995 US dollars, low elasticity case)

	AGREEMENTS WITH:						
	MERCOSUR	*NAFTA*	*NAFTA & MERCOSUR*	*NAFTA & MERCOSUR& EU*	*NAFTA & MERCOSUR & EU & Rest of SA [b]*	*FREE TRADE AGREEMENT OF THE AMERICAS*	*GLOBAL FREE TRADE*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Country							
1. Chile	-67	149	239	1013	1318	209	270
2. United States	-24	306	231	59	-11	4708	10833
3. Canada	4	-15	-13	14	19	-278	-2058
4. Mexico	1	-35	-35	-3	0	-685	-3315
5. Argentina	44	-18	54	54	28	188	1327
6. Brazil	108	-36	15	-11	-21	648	1004
7. Central America	3	-21	-21	-29	-36	4047	2680
8. Rest of So. America	-28	-39	-75	-90	-376	788	2110
9. European Union	-28	-241	-317	156	86	-4774	88720
10. Japan	-30	-48	-69	-76	-91	-804	73711
11. Rest of the World	29	-89	-100	-229	-232	-3560	23348
12. Sum for Included Countries [c]	85	405	491	1282	1043	9625	
13. Sum for Excluded Countries [d]	-73	-492	-582	-424	-359	-9138	
14. Sum over all counttries	12	-87	-91	858	684	487	198626

[a] All products included in agreements and lumpsum tax replacement.
[b] Rest of SA is South America except for Chile, Argentina and Brazil.
[c] Sum of the welfare impact for countries included in the agreement.
[d] Sum of the welfare impact for countries excluded from the agreement.
Source: Model estimates by authors.

Table 9: Ad Valorem Protection Estimates for All the Countries (Regions) and Products in our model[a]

SECTOR	CHILE	ARGENTINA	BRAZIL	REST OF SOUTH AMERICA	USA	CANADA	MEXICO	CENTRAL AMERICA	EU	JAPAN	REST OF THE WORLD
WHT	11	5	2	6				5	78	308	41
GRO	11	4	3	13		1		21	92	336	96
NGC	11	5	5	25	15	1	1	7	52	42	32
WOL	11	4	5	13	1			11	2		35
FRS	11	2	2	15			2	8			
FSH	11	6	5	17	1		1	11	6	5	17
ENR	11			22			1	7			
MIN	11	4	6	27	3	2	4	11			11
MEA	11	4	8	31	10	8	2	20	61	308	50
MIL	11	14	15	31	87	115	6	8	149	207	38
FOO	11	9	9	22	4	3	2	10	12	14	17
B_T	11	17	16	48	4	3	14	26	21	11	48
TEX	11	16	12	43	15	14	5	27	10	11	28
LUM	11	9	11	37	1	2	2	15	2	3	14
PPP	11	8	8	11		2	1	9	1		12
CRP	11	9	9	26	9	2	3	9	10	4	14
I_S	11	5	12	25	9	5	3	8	4	4	13
NFM	11	6	7	22	3	1	2	8	1	1	11
FMP	11	11	15	41	5	3	3	13	3	3	20
TRN	11	10	15	27	2	2	2	19	4	2	20
MAC	11	14	15	30	15	2	3	10	7	1	14
T_T	11										
SER	11										

[a] Tariff estimates include the estimated tariff equivalents of non-tariff barriers.

Figure 1: Production and Allocation of Output

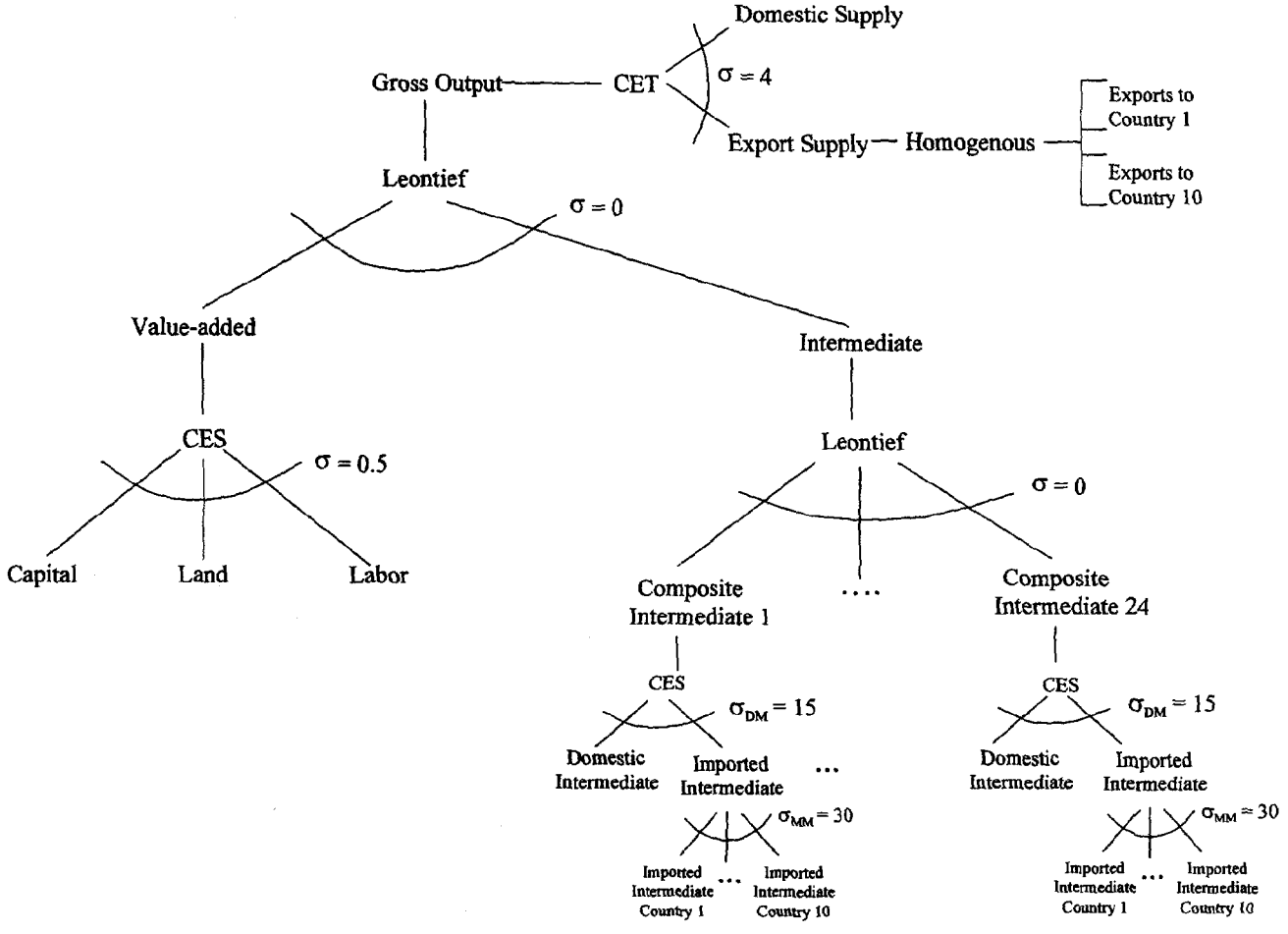
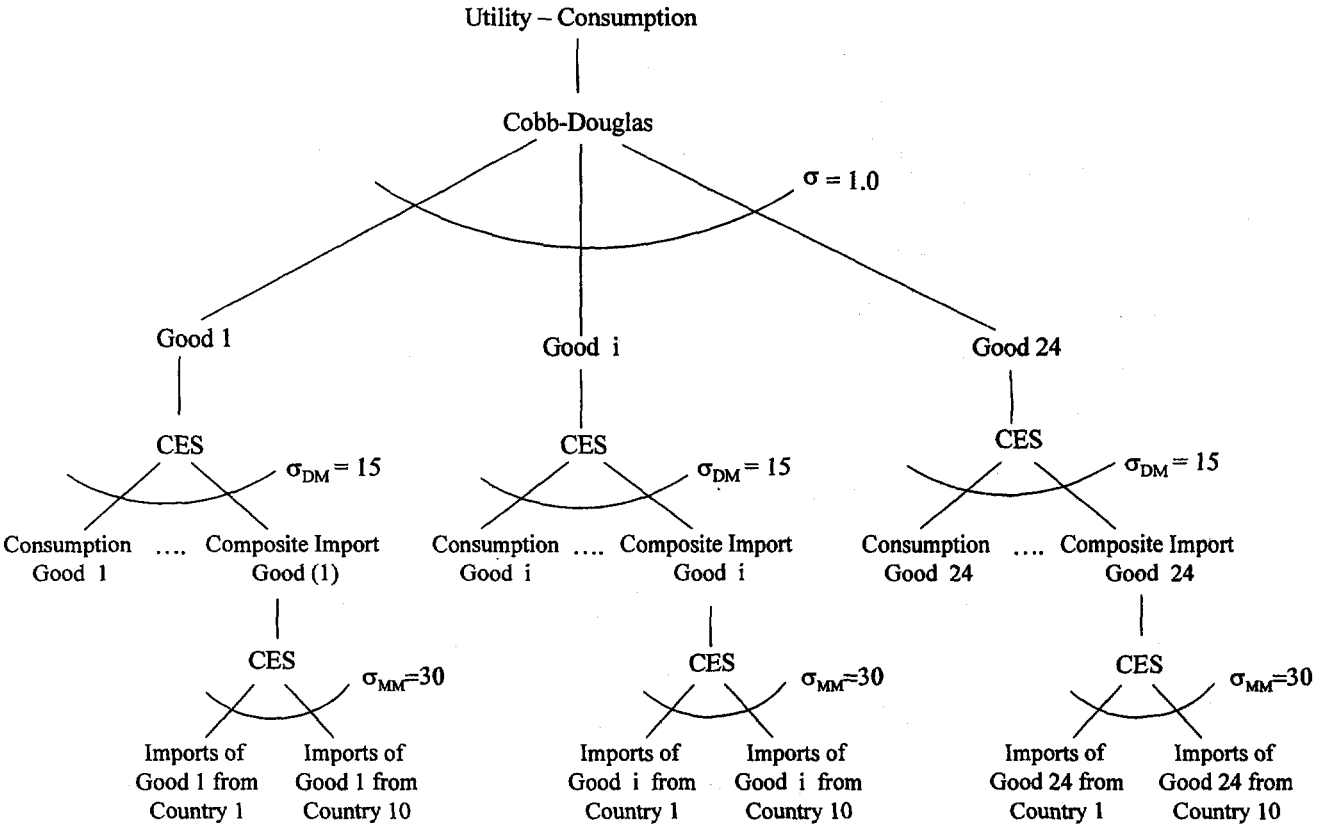


Figure 2: Consumer Demand



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